

United States Patent [19]

Kohl et al.

Patent Number: [11]

5,736,898

Date of Patent: [45]

Apr. 7, 1998

[54] PROCESS AND DEVICE FOR LINEARIZING THE GAIN CHARACTRISTICS AND PHASE-FREQUENCY CHARACTERISTICS OF TRAVELING-WAVE TUBES AND TRANSISTOR AMPLIFIERS AT DIFFERENT POWER LEVELS

[75] Inventors: Rudolf Kohl, Steinhöring; Gerhard Eggers, Bruckmühl, both of Germany

[73] Assignee: Daimler-Benz Aerospace AG. Ottobrun, Germany

[21] Appl. No.: 691,882

Aug. 4, 1995 [DE]

[22] Filed: Aug. 1, 1996

[30] Foreign Application Priority Data

[51]	Int. Cl. ⁶	H03F 1/32
	U.S. Cl	
[58]	Field of Search	330/43, 53, 124 R.
		330/140+ 333/14

Germany 195 28 844.0

[56] References Cited

U.S. PATENT DOCUMENTS

4.878,030	10/1989	Vincze	330/149
5,291,148	3/1994	Reisner et al	330/149

OTHER PUBLICATIONS

J. Maynard, et al. May 1994 Fully MMIC Ku-Band and C-Band CAMP/Linearizers for TWTAs Proceedings of the SPACE TWTAs 1994 Workshop ESA WPP-072.

A. J. Khilla May 1994 Linearization of Power Amplifiers for Satellite Application Proceedings of the SPACE TWTAs 1994 Workshop ESA WPP-072.

A. Berman et al., 1992, Linearized Microwave Amplifiers, 14th International Communications Satellite Systems Conference, Washington, DC, AIAA-92-1864-CP.

G. Satoh, Oct. 1979 (1981), Linearizer for High-Power Traveling Wave Tube Amplifier, Electronics and Communications in Japan, vol. 62, p. 72.80.

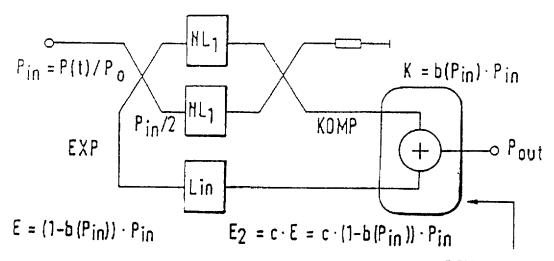
S. S. Moochalla, et al., 1992, A Integrated Ku-Ban Linearizer Driver Amplifier for TWTA's with High Grain and Wide Bandwidth, 14th International Communications Sat-Systems Conference, Washington, AIAA-92-1825-CP.

Primary Examiner-Steven Mottola Attorney, Agent, or Firm-McGlew and Tuttle

[57] **ABSTRACT**

A process for linearizing the gain and phase-frequency characteristics of traveling-wave tubes and transistor amplifiers at different power levels is suggested, wherein the signal is divided between two branches and again united into the output signal, and in which the signal is divided between partial networks with compressing gain behavior, which are placed between two 3-dB couplers, and gain compression or gain expansion of the partial signals (E or K) is generated at two gates (KOMP, EXP) by the reflection behavior, which is different corresponding to the signal level, and the level of the nonlinear, gain-expanded partial signal (E) is raised by a linear amplifier (E2), and the additionally amplified. gain-expanded signal (E2) and the gain-compressed signal (K) are then united into the output signal with an adding network.

8 Claims, 2 Drawing Sheets



COUPLING NETWORK